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ing as the object to be shown is white or black. It may be $\frac{5}{16}$ of an inch in diameter for the Lieberkühn of the $1\frac{1}{2}$ inch objective, but not over $\frac{1}{4}$ inch for that of the $\frac{2}{3}$ objective. After the cement is dry and quite hard, a thin coat of balsam is spread over it and the objects placed in this and arranged if necessary under the microscope. The slide is then set aside to dry and may safely be covered the next day. If the object to be mounted will bear immersion in balsam, as some shells, seeds, minerals, etc., I pursue the following plan: The thin glass covers are cemented to some old slips, kept for the purpose, by two or three touches of the balsam applied to the edge of the cover, care being taken to center the cover on the slip by means of the self centering turn-table. The objects are then arranged on a light coating of balsam on the center of the cover. When quite dry they should be completely covered by balsam and thoroughly hardened in the drying oven. Then Brunswick black or white zinc may be spread over the object, in thin layers at first, each being dried in the open air for a day before putting on the next, until an opaque covering is made for the object. Thoroughly clean the cover around the objects and then remove it from the slip by a slight heating. Then turn it over and mount it upon the cell prepared for it. Fasten the cover to the cell with gelatine softened by water to the consistency of jelly and then liquified by alcohol. Put the cover on the cell and apply the gelatine solution with a brush around the edge, leaving the little opening before referred to. When dry the cell may be finished with liquid balsam, carefully avoiding the little aperture. The outer edge may be gathered up into a neat trim circle with the point of a knife on the turn-table. —*C. C. Merriman, Rochester, New York.* (*Read at the National Microscopical Congress at Indianapolis, August,* 1878.)

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SCIENTIFIC NEWS.

— British Association for the Advancement of Science. We conclude our account of the last meeting, which was, on the whole, one of the largest, most varied and pleasant that has been held for twenty years. Several of our American scientists read papers. Prof. T. Sterry Hunt made communications on the Metamorphic or Archæan rocks of America as compared with those of Great Britain, and also on the geological relations of the atmosphere. Prof. E. D. Cope read papers on the Saurians of the Dakota formation of the Rocky mountains, and on the Vertebrata of the Permian formation of Texas. Mr. Graham Bell made a communication on the Telephone. Prof. Cook, State-geologist of New Jersey, was also present. Of the papers of special interest, we note one in the zoölogical section by Sir Victor Brooke on the deer; a good point he made was the existence of a constant variation in the horn of *Cervus dama*, which originated in an old buck, and now characterizes the entire herd in one park in West Ireland.

In physiology a good paper was the one on the location of sounds in the head on application of tuning-forks, telephone, microphones, etc.

In zoölogy another good paper was by Dr. Traquair on the structure of *Ctenodus* and *Dipterus*, in which he showed that the head of the latter is covered with segmented scuta like the sturgeon; the author brought out many other important points.

In general it may be remarked that the conduct of the meetings of the Association is very similar to that of our own. The tendency to complimentary criticism was probably rather more largely developed, but this did not prevent the fullest expression of adverse opinions when such were entertained.

As a good example of one of the evening lectures we quote, in part from the Dublin *Irish Times*, an abstract of Mr. J. G. Romanes' lecture on "Animal Intelligence," which attracted special interest; he said: "We thus see animal instincts may arise in either of two different ways, on the one hand, they may arise from the performance of actions which were originally intelligent, but which by frequent repetition have become automatic; and on the other hand, they may arise from survival of the fittest, preserving actions, which, although never intelligent, happen to have been of benefit to the animals which first chanced to perform them. But now let it be observed that although there is a great difference between these two kinds of instincts if regarded psychologically, there is no difference between them if regarded physiologically; for, regarded physiologically, both kinds of instincts are merely expressions of the fact that particular nerve-cells and fibres have been set apart to perform their reflexes automatically—that is, without being accompanied by intelligence. In making these observations we are not necessarily committing ourselves to the doctrine of materialism. That physiological phenomena are intimately connected with natural phenomena does not admit of doubt, but concerning the nature of this association scientific men declare not merely that it is at present unknown, but that, so far as they are at present able to discern it must forever remain unknowable. The restless tide of intellect for centuries has onward rolled, submerging in its arms those rugged shores whose name is mind, but at the lines where mind and matter meet there arises a mighty history like a frowning cliff, and in the darkness of the place we hear the voice of true philosophy proclaim: 'Hitherto shalt thou come, but no further, and here shall thy proud wave be stayed.' So much then for what I have called the physiological basis of mind. Passing on now to our review of comparative psychology, the first animals in which so far as I can ascertain we may be quite sure that reflex action is accompanied by ideation, are the insects. Well, remembering this distinction, we shall find that the only difference between animal intelligence and human intelligence consists in this—that animal intelligence is unable to elaborate that class of abstract ideas the formation of which depends on the faculty of speech. In other words, animals are quite as able to form abstract ideas as we are, if under abstract ideas we include general ideas of qualities which are so far simple as not to require to be fixed in our thoughts by names." The lecturer also proceeded to show that animals had reason and judgment. "Passing on to the emotional life of animals, we find that this is very slightly, if at all, developed in the lower orders, but remarkably well developed in the higher; that is to say, the emotions are vivid and easily excited, although they are shallow and evanescent. They thus differ from those of most civilized men in being more readily aroused and more impetuous while they last, though leaving behind them but little trace of their occurrence. As regards the particular emotions which occur among the higher animals, I can affirm from my own observations that all the following give unmistakable tokens of their presence: Fear, affection, passionateness, pugnacity, jealousy, sympathy, pride, reverence, emulation, shame, hate, curiosity, revenge, cruelty, emotion of the ludicrous and emotion of the beautiful. Now this list includes nearly all the human emotions, except those which refer to religion and to the perception of the sublime. These, of course, are necessarily absent in animals, because they depend upon ideas of too abstract a nature to be reached by the mind when unaided by the logic of signs. Time prevents me from here detailing any of my observations or experiments with regard to the emotional life of animals, so I will pass on at once to the faculty of conscience. In highly intelligent, highly sympathetic and tolerably well treated animals the germ of a moral sense becomes apparent. On the whole, therefore, I can only suppose that we have in these actions evidence of as high a development of the ethical faculty as is attainable by the logic of feelings when unassisted by the logic of signs; that is to say, a grade very nearly if not quite as high as that with which we meet in low savages, young children, many idiots and uneducated deaf mutes. In savages, as in animals, there was a remarkable tendency to act in accordance with performed habits rather than to strike out improved modes of action. Very young children present only those lower faculties of mind which in animals we call instincts. With advancing age, the first indication of true intelligence seems to consist in the power of forming special associations. On the general theory of evolution we should expect that in such a descending scale the characteristically human, or the more recently developed faculties should be the first to disappear, while those faculties which man shares with the lower animals should be the more persistent. And this expectation I have found to be fairly well realized. Beginning from below, the first dawn of intelligence in the ascending scale of idiots, in the ascending scale of animals, is invariably to be found in the power of associating simple concrete ideas. Thus there are very few idiots so destitute of intelligence that the appearance of food does not arouse in their minds the idea of eating; and, as we ascend in the scale idiotic, we find the principle of association progressively extending its influence, so that the mind is able, not only to establish a greater and greater number of special associations, but also to retain these associations with an ever increasing power of memory. In the case of the higher idiots, as in the case of higher animals, it is surprising in how considerable a degree the faculty of special association is developed notwithstanding the dwarfed condition of all the higher faculties. On the whole then, from the mental condition of uneducated deaf mutes, we learn the important lesson that in the absence of language the mind of man is almost on a level with the mind of a brute in respect of its power of forming abstract ideas.

The Association will meet next year at Sheffield, under the presidency of Prof. Allman.

— THE CONGRESS OF GEOLOGISTS AT PARIS. The existence of this body is due, firstly, to the exertions of a committee which met in Philadelphia during the Exposition of 1876; and secondly, to the energetic coöperation of the Geological Society of France, which took in charge the arrangement of the details of the organization. The officers selected by this body and elected by the Congress on its opening, were the following: president, M. Hébert; vice-presidents, England, M. Davidson; Belgium, De-Koninck; Canada, Sterry Hunt; Denmark, Johnstrupp; Spain, Villanova; United States, Hall; France, Daubrée and Gaudry; Hungary, Szabo; Italy, Capellini; Holland, Von Baumhauer; Portugal, Ribeiro; Roumania, Stephanescu; Russia, De Moeller; Sweden, Thorell; Switzerland, Favre; general secretary, Jannetaz; secretaries, M. Brocchi, Delaire, Sauvage and Vélain; treasurer, M. Bioche.

The Congress assembled on Thursday, the 22d August, in the large hall above the commencement of the left wing of the Trocadero. To such of our readers as have not seen this building it may be interesting to remark, that it is situated on the side of a hill on the right side of the Seine, which slopes gently towards the bank of the river. It faces the main building of the Exposition which stands on the left bank, the two being connected by ornamental grounds, and by the bridge of Jèna. The building consists of a central portion of the form of a semicircle to which are added two long arm-like wings, which follow the direction of the circumference of a large circle for perhaps 120°. The convexity of the central building is inwards, and presents several porticoes, one above the other. From the summit of the lowest of these a wide sheet of water descends with a face convex transversely, and is received into a basin. From this the water flows by a succession of falls to a large basin below, which is adorned with numerous fountains. At four points in its circumference are the gilded figures, of life size, of four prominent species of animals—the elephant, horse, ox and rhinoceros. On each side of the staircase of waterfalls is a series of small fountains composed of very many fine jets of little elevation, the whole producing the effect of tufted vegetation.

The hall of meeting is well adapted for the use of the Congress, which includes a membership of two hundred and fifty persons. The proceedings of the first day, August the 29th, opened with an election for officers, which resulted in the selection of the names above enumerated. An allocution from Prof. James Hall, of New York, president of the committee of Philadelphia, followed. The report of this committee succeeded, and the organization was completed by the announcement of the names of the officers elected.

The papers announced for the opening day were the following: 1. M. Daubrée, Etudes expérimentales sur les déformations et les cassures de l'écorce terrestre. 2. M. A. Favre, Sur les expériences relatives aux effets de refoulements latéraux en géologie. 3. M. De Chancourtois, Représentation et coordination des faits d'alignements (Failles et Filons). 4. M. De Lapparent, Les plissements de la craie entre la France et l'Angleterre à propos du chemin de fer sous-marin. 5. M. Gorceix, Sur les gisements aurifères et sur les pierres précieuses du Brésil.

The papers for the 30th of August were the following: 1. M. James Hall, On the Nomenclature of American palæozoic rocks and the construction of geological maps. 2. M. Stephanescu, Nomenclature géologique uniforme pour tous les pays en ce qui regarde les terrains et les étages. 3. M. Van den Broeck, Valeur des termes de l'échelle stratigraphique du globe. 4. M. Renevier, Rapport sur l'emploi des couleurs et des termes désignant les subdivisions des terrains. 5. M. Rutot, De l'adoption des subdivisions uniformes pour les terrains tertiaries. 6. M. De Chancourtois, Unification des conventions pour les cartes gélogiques. 7. M. Villanova, Bases d'un dictionnaire de géologie. 8. M. l'Abbé Almera, Réimpression des ouvrages de paléontologie.

On the 31st of August the following papers were read: 1. T. Sterry Hunt, Limits of the Cambrian Formation. 2. De Moeller, Composition et subdivisions générales du système carbonifère. 3. J. P. Lesley, Limits of the Permian and Carboniferous in Pennsylvania, 4. Vélain, Phénomènes Geysériens dans le Trias de Morvan à propos de la délimitation du Trias et du Lias.

The following papers were read on the 2d of September: 1. Cope, Relations of horizons of Vertebrate Fossils of Europe and North America. 2. Gosselet, De la Synonomie des especes fossiles au point de vue du droit de priorité. 3. Rouault, Amorphozoaires du Silurien inferieure de Bretagne. 4. DeMorillet, Divisions du Quaternaire. 5. Winkler, Origine des dunes sur le littoral de la Hollande. 6. Van den Broeck, Influence des phénomènes météoriques sur l'altération des Róches. 7. W. P. Blake, Geological Maps of the United States of North America. 8. Violet d'Aoust, Origine des volcans. 9. Bouejot (by M. Delesse), Calcaire blue eruptif. 10. Choffat, Mélanges d'horizons stratigraphiques par suite des mouvements du sol.

Papers of the 3d of September: 1. Des Cloizeaux, Microcline et Feldspaths tricliniques. 2. Michel Lévy, Emploi du Microscope polarisant à lumière parallèle pour l'étude des roches. 3. Jannetaz, Rapports de la propagation de la chaleur dans les roches et de leur structure, au point de vue de leur origine. 4. Vélain, Ses Roches trachytiques de la Réunion au point de vue de la classification. 5. Sterry Hunt, Terrains Precambriens de l'Amerique du Nord. 6. Szabo, Classification et chronologie des roches éruptives tertiaires de la Hongrie. 7. Ribeiro, Formation Tertiaire du Portugal. 8. Chamberlin, The Kettle Moraine of the Great Lake district of North America.

On September the fourth, the Council presented to the Congress several propositions, viz.:

A committee to propose a system of coloration for geological maps.

A committee to propose a uniform nomenclature for geological horizons and formations.

A committee to investigate and report on a method of uniformity in nomenclature in palæontology.

That the second meeting of the Congress take place three years hence in Bologna, Italy.

That in the *interim* the present Council of the Congress transact its affairs.

Which propositions were, with slight modifications of their original forms, adopted by the Congress.

The sessions of the Congress were largely attended, and under the able ruling of Professor Hèbert, were conducted with dispatch and effect. The interest of the occasion was enhanced by the entertainments offered by the Department of Public Instruction and by private citizens. Of the former may be mentioned that at the Arts et Metiers, where the garden was illuminated by the Jablokoff lights, and the one at the residence of the Minister. Of the latter, the entertainments at the residences of Profs. Hèbert, Gaudry and Daubrée, will be remembered by those who attended them. After the adjournment of the Congress a banquet was held at the Hotel Continental.

A number of the members of the Congress remained to take part in the annual excursions of the Geological Society of France, which immediately followed.

— In his recent lecture on civilization and science, Prof. Du

Bois-Reymond asks that more science be taught in the German gymnasia, though he does not propose to convert the gymnasium into a school for science-teaching. "All that I ask is that as much shall shall be done to meet the wants of the future physician, architect or military officer as those of the future judge, or preacher, or teacher of classical languages. Thus I ask for only so much natural history in the lower classes of the school as will awaken the faculty of observing, and that facilities be given for familiarizing the lads with the methods of classification which is rooted in the depths of the understanding, and whose educational force is so eloquently described by Cuvier. Let Darwinism, of which I am myself an adherent, be excluded from the gymnasium. In the higher classes, for the reasons assigned in my report, I should like to have taught, not physics and chemistry with experiments, but mechanics, the elements of astronomy, also of mathematical and physical geography—to which studies one hour more than heretofore could be devoted without injury."

— In Von Ihering's recent work on the nervous system of molluscs, a new arrangement of the molluscs is given which may be novel to our malacologists, as the work itself is rather expensive. The genus Chiton and allies are associated with the worm Chætoderma and the doubtful form Neomenia, forming the Phylum *Amphineura*, as follows :

VERMES.

Phylum *Amphineura*.

Class 1. *Aplacophora* (Chætoderma, Neomenia).
" 2. *Placophora* (Chitonidæ).

The mollusca are thus arranged:

MOLLUSCA.

Phylum I. *Acephala* (Lamellibranchiata).
" II. *Solenoconchæ* (Scaphopoda).
" III. *Arthrocochlides* (Gastropoda, Prosobranchiata).
" IV. *Platycochlides* (Class 1. Ichnopoda, embracing the Nudibranchiata, Tectibranchiata and Pulmonata.)
    " 2. Pteropoda.
    " 3. Cephalopoda.

— A work on the songs of birds and other animals as related to human music, and as furnishing a basis for a theory of melody, is in course of preparation by Mr. Xenos Clarke, of San Francisco, Cal., who writes that "the chief impediment is the lack of recorded observations. I should be most grateful if you could kindly assist me in any of these ways, viz :

"1. References to books, etc., containing songs of birds or other animals in musical notation. (Copies of these would be still more valuable.)

"2. Results of your observations on birds or their songs.

"3. Is there noticed with any frequency in these songs the occurrence of any fundamental intervals of human music, as the octave, fifth, fourth and third ?

"4. (A question only seemingly irrelevant.) If singing in the ears has ever happened to you, have any of the fundamental intervals, above mentioned, been observed between the minute tones?

"5. Any information that may occur to you as bearing on these subjects?" We refer the matter to our ornithological readers.

— The *Zoologischer Anzeiger*, published in Leipzig and edited by Prof. J. Victor Carus, proves to be a most useful periodical. The editor has two objects in view: besides giving digests of new works and articles, to make the literature complete as possible and to have the addresses of working and teaching zoölogists, zoötomists, anatomists and palæontologists, as full and trustworthy as may be. For this purpose he would like to receive the aid of American naturalists, and especially to receive copies of our journals and proceedings in exchange for his journal. The *Anzeiger* will, by and by, contain a list of public museums, institutes, etc., which are not connected with universities and colleges. As the journal is published fortnightly, men of science will find it the most convenient way of publishing quickly short preliminary abstracts of new researches of all kinds relating to zoölogy.

— The New York Academy of Sciences begins its sessions for the winter in its new rooms, handsomer and more attractive than its previous quarters. The library of the Academy has been moved up town into rooms granted for it, in the new (fire-proof) building of the American Museum of Natural History, where it is to have the best care and accommodations and remains subject to the control of the Academy.

— The eleventh annual meeting of the Kansas Academy of Science was held at Topeka, on October 8th and 9th, with an attendance larger than in previous years. The number of papers presented was also larger than usual. Prof. B. F. Mudge, of Manhattan, was elected president, and E. A. Popenoe, of Topeko, secretary, for the ensuing term of one year.

— Recent arrivals at the Philadelphia Zoölogical Garden: 1 water snake (*Tropidonotus sipedon*), New Jersey; 2 capybaras (*Hydrochœrus capybara*); 1 douroucouli (*Nyctipithecus trivirgatus*); 1 capucin (*Cebus apella*), South America; 2 bonnet macaques (*Macacus radiatus*); 2 rhesus monkeys (*Macacus erythræus*); 1 common macaque (*Macacus cynomolgus*), India; 5 Guinea baboons (*Cynocephalus sphinx*), West Africa; 1 large alligator (*Alligator missippiensis*), Florida; 1 European glass snake (*Pseudopus pallasii*), Austria; 5 copperheads (*Ancistrodon contortrix*), Pennsylvania; 1 green bittern (*Ardea virescens*); 1 golden-crowned thrush (*Seiurus aurocapillus*) Pennsylvania; 2 cinereous vultures (*Vultur cinereus*); 2 griffon vultures (*Gyps fulvus*), North Africa; 4 barn owls (*Strix flammea americana*); 2 Angora rabbits; 7 weeper capucins (*Cebus capucinus*), South America; 1 little brown bat (*Vespertilio subulatus*), New Jersey; 1 brown pelican (*Pelecanus *fuscus*), Florida; 1 rufous rat kangaroo (*Hypsiprymnus rufescens*), born in the garden; 1 pig-tailed macaque (*Macacus nemestrinus*); 1 rhesus monkey (*Macacus erythræus*), India; 6 hog-nosed snakes (*Heterodon platyrhinus*); 1 garter snake (*Eutænia sirtalis parietalis*), Ohio; 1 opossum (*Didelphys virginiana*); 2 gray lizards (*Sceloporus undulatus*), New Jersey; 1 black snake (*Bascanion constrictor*); 1 water snake (*Tropidonotus rhombifer*), Illinois; 1 brindled gnu (*Catoblepas gorgon*), South Africa; 1 common quail (*Ortyx virginianus*); 2 whooping cranes (*Grus americanus*); 2 sandhill cranes (*Grus canadensis*), North America; 2 red coatis (*Nasua nasica rufa*), South America; 1 elk (*Cervus canadensis*), born in the garden; 2 tortoises (*Testudo tabulata*), South America; 1 gray squirrel (*Sciurus carolinensis*); 2 common hoopoes (*Upupa epops*), Europe, Asia and North Africa; 1 jackdaw (*Corvus monedula*), Europe and Asia; 1 sickle-billed curlew (*Numenius longirostris*), Atlantic States; 1 night hawk (*Chordeiles virginianus*), United States; 4 common chameleons (*Chamæleo vulgaris*), Europe, Asia and North Africa; 1 Yarrell's curassow (*Crax carunculata*), Brazil; 1 screech owl (*Scops asio*); 1 cat-bird (*Mimus carolinensis*); 1 green linnet (*Ligurinus chloris*); 1 chaffinch (*Fringilla cœlebs*), Great Britain; 2 white-footed mice (*Hesperomys leucopus*), United States; 1 Savannah deer (*Cervus savannarum*), born in the garden.—*Arthur E. Brown, Gard. Supt.*

— AMERICAN NATURALIST. The numbers of this journal issued during the past year were published at the following dates: February, January 31st; March, February 23d; April, March, 19th; May, April 22d; June, May 22d; July, June 28th; August, July 27th; September, August 21st; October, September 23d; November, October 30th; December, November 29th. —*Editors.*

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PROCEEDINGS OF SCIENTIFIC SOCIETIES.

NATIONAL ACADEMY OF SCIENCES.—The semi-annual meeting was held at New York, November 5-7. A report to Congress, recommending the future consolidation of the various geodetic, geographical and geological surveys of the United States, was adopted by the Academy. The following papers on natural science were read and discussed: The early types of insects, by S. H. Scudder; On the arrangement of the exhibition rooms in the Museum of Comparative Zoölogy at Cambridge; Arrangement of a zoölogical marine laboratory at Newport; On the embryology of the gar pike; On some of the zoölogical results of the United States Coast Survey Steamer *Blake*, by Alexander Agassiz; On some remains of new Dipnoan fishes and their relation to living forms; On some mooted points in American geology, by J. S. Newberry; On the characters of Theromorphous reptiles, by E. D. Cope; Note on the Two-ocean Pass, Wyoming Territory; On the discovery of recent glaciers in the Wind River mountains; Plan of a general geolog-